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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/900,779	07/06/2001	Michael K. Brand	12177/21101	7688

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KENYON & KENYON  
One Broadway  
New York, NY 10004

EXAMINER

SHARON, AYAL I

ART UNIT PAPER NUMBER

2123

DATE MAILED: 03/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/900,779

Applicant(s)

BRAND ET AL.

Examiner

Ayal I. Sharon

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9, 11-13, 15-19, 21 and 22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9, 11-13, 15-19, 21 and 22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 May 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>12/23/05</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Introduction*

1. Claims 1-9, 11-13, 15-19, and 21-22 of U.S. Application 09/900,779 are currently pending. The application was originally filed on 7/6/2002.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The prior art used for these rejections is as follows:
4. Siegel, B. "Reliability and the Electronic Engineer". Intersil Corporation  
Application Note AN1104. March 24, 1998. <http://intersil.com/data/an/an1104.pdf>.  
("Siegel").
5. Weibull.com. "Arrhenius Relationship Introduction." Printed from the 4/23/2001  
archived version of the Weibull.com web site stored at Archive.org. at the  
following URL:  
[http://web.archive.org/web/20010423072851/weibull.com/AccelTestWeb/arrhenius\\_relationship\\_introduction.htm](http://web.archive.org/web/20010423072851/weibull.com/AccelTestWeb/arrhenius_relationship_introduction.htm). ("Weibull").
6. Reliasoft's ALTA 1.0 On-Site Training Guide. © 1999. ("Reliasoft")

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7. The claim rejections are hereby summarized for Applicant's convenience. The detailed rejections follow.

8. **Claims 1-9, 11-13, 15-19, and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Siegel in view of Reliasoft.**

9. In regards to Claim 1, Siegel teaches the following limitations:

determining accelerated stress testing data for the product using the relationship  $t_F = AF \times \exp(t_A)$ , the accelerated stress testing data representing the response of the product operating in a first environment; and

(See Siegel, especially: Equations 1, 2, and 3 on p.1)

calculating the mean-time-between-failures (MTBF) for the product operating in a second environment based on the accelerated stress testing data.

(See Siegel, especially: Equations 1, 2, and 3 on p.1)

At first glance, the Arrhenius Relationship expression in Equation 1 of Siegel is ambiguous due to poor arrangement of the typeface. It is not clear if the expression is " $e - (EA/KT_2 - EA/KT_1)$ ", or " $e^{-(EA/KT_2 - EA/KT_1)}$ ". The calculations performed immediately below Eq.3 in the reference, however, prove that the Arrhenius Relationship is an exponential function.

Siegel also expressly teaches the following (see para.1 of section titled "Reliability Overview"):

The Arrhenius relationship which is common in many physical and chemical processes has been found to fit the failure rates in IC's as well.

Moreover, Siegel also expressly teaches the following (see para.5 of section titled "Reliability Overview"):

In order to calculate the MTBF we will also need to obtain reliability data from the IC vendor. Virtually all manufacturers routinely run life tests on devices which span their product line and package repertoire. Life test

usually means placing devices in a burn oven, under power, at temperatures which are typically set at 125°C for 1,000 hours or more.

In regards to the following claimed limitation, Examiner interprets that the claimed variables  $t_F$ ,  $t_A$ , and AF can be easily derived using equations 1,2, and 3 as taught in Siegel.

wherein  $t_F$  is a time to failure on a field use time scale, AF is an acceleration factor, and  $t_A$  is a time to failure on an accelerated time scale.

These values can be calculated by determining the MTBFs for two different sets of conditions.

In addition, the reference also teaches the use of Poisson statistics when the real world data indicates zero failures.

However, Siegel does not expressly teach that the exponential relationship, otherwise known as the "Arrhenius relationship", is implemented in the form of computer-executable instructions, as claimed in the following limitations:

1. A machine-readable medium storing computer-executable instructions to perform a method of estimating a life of a product, the method comprising:

The Reliasoft reference, on the other hand, does teach the software implementation of the Arrhenius model (See Reliasoft, especially: pp.9, 11, 13, 15, 43, 44).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Siegel with those of Reliasoft, because Reliasoft teaches the automation of the process taught in Siegel.

10. In regards to Claim 2, Siegel teaches the following limitations:

2. The machine-readable medium of claim 1, wherein said first environment is more likely than the second environment to cause the product to fail.

(See Siegel, especially: section titled "Reliability Overview")

11. In regards to Claim 3, Siegel teaches the following limitations:

3. The machine-readable medium of claim 1, wherein the accelerated stress testing data represents the length of time the product operates in the first environment before the product fails.

(See Siegel, especially: section titled "Reliability Overview")

12. In regards to Claim 4, Siegel teaches the following limitations:

4. The machine-readable medium of claim 1, wherein the accelerated stress testing data is derived from a plurality of different stress tests.

(See Reliasoft, especially: p.34. The figure in the middle of the page shows several types of stress tests, including temperature and vibration)

13. In regards to Claim 5, Reliasoft teaches the following limitations:

5. The machine-readable medium of claim 4, wherein the plurality of different stress tests includes a temperature test and a vibrational test.

(See Reliasoft, especially: p.34. The figure in the middle of the page shows several types of stress tests, including temperature and vibration)

14. In regards to Claim 6, Siegel teaches the following limitations:

6. The machine-readable medium of claim 1, further comprising calculating upper and lower confidence limits for the MTBF calculation.

(See Siegel, especially: p.4, "Average Failures Confidence Level" table)

15. In regards to Claims 7-9, 11-13, 15-19, and 21-22, they are rejected under the same grounds as claim 1.

**16. Claims 1-5, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weibull and in view of Reliasoft.**

17. In regards to Claim 1, Weibull teaches the following limitations:

determining accelerated stress testing data for the product using the relationship  $t_F = AF \times \exp(t_A)$ , the accelerated stress testing data representing the

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response of the product operating in a first environment; and

calculating the mean-time-between-failures (MTBF) for the product operating in a second environment based on the accelerated stress testing data,

wherein  $t_F$  is a time to failure on a field use time scale,  $AF$  is an acceleration factor, and  $t_A$  is a time to failure on an accelerated time scale.

More specifically, Weibull expressly teaches the following (see p.1 of

Weibull):

"The Arrhenius stress-life model is formulated by assuming that life is proportional to the inverse reaction rate of the process, thus the Arrhenius stress-life relationship is given by:

$$L(V) = Ce^{(B/V)}$$

- $L$  represents a quantifiable life measure, such as mean life, characteristic life, median life, or B9x) life, etc.
- $V$  represents the stress level (formulated for temperature and temperature values in absolute units i.e., degrees Kelvin or degrees Rankine).
- $C$  is one of the model parameters to be determined ( $C > 0$ ).
- $B$  is another model parameter to be determined.

Examiner interprets that the claimed variable  $t_F$ , "time to failure", corresponds to Weibull's variable " $L$ ". Both variables represent what Weibull defines as a "quantifiable life measure."

Examiner interprets that the claimed variable " $AF$ " corresponds to Weibull's variable " $C$ ". Both variables represent scaling factors.

In addition, Examiner interprets that the claimed variable  $t_A$ , "time to failure on an accelerated time scale", corresponds to Weibull's variables " $(B/V)$ ." Weibull defines " $B$ " as a scaling factor, and " $V$ " as a "stress level" variable.

Arrhenius teaches (see Arrhenius, top of page 1) that:

“The Arrhenius stress-life model (or relationship) was originally formulated for accelerated life testing in which the acceleration variable (or stress) is thermal (i.e. temperature).”

Examiner interprets that the phrase “was originally formulated for accelerated life testing in which the acceleration variable ... is thermal” implies that the Arrhenius model can be used for non-thermal accelerated life testing as well.

However, Weibull does not expressly teach that the exponential relationship, otherwise known as the “Arrhenius relationship”, is implemented in the form of computer-executable instructions, as claimed in the following limitations:

1. A machine-readable medium storing computer-executable instructions to perform a method of estimating a life of a product, the method comprising:

The Reliasoft reference, on the other hand, does teach the software implementation of the Arrhenius model (See Reliasoft, especially: pp.9, 11, 13, 15, 43, 44).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Weibull with those of Reliasoft, because Reliasoft teaches the automation of the process taught in Weibull.

18. In regards to Claim 2, Weibull teaches the following limitations:

2. The machine-readable medium of claim 1, wherein said first environment is more likely than the second environment to cause the product to fail.

Examiner interprets that these scenarios are inherently addressed by the use Arrhenius equation

19. In regards to Claim 3, Weibull teaches the following limitations:



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3. The machine-readable medium of claim 1, wherein the accelerated stress testing data represents the length of time the product operates in the first environment before the product fails.

Examiner interprets that these scenarios are inherently addressed by the use Arrhenius equation

20. In regards to Claim 4, Weibull teaches the following limitations:

4. The machine-readable medium of claim 1, wherein the accelerated stress testing data is derived from a plurality of different stress tests.

Examiner interprets that these scenarios are inherently addressed by the use Arrhenius equation

21. In regards to Claim 5, Reliasoft teaches the following limitations:

5. The machine-readable medium of claim 4, wherein the plurality of different stress tests includes a temperature test and a vibrational test.

(See Reliasoft, especially: p.34. The figure in the middle of the page shows several types of stress tests, including temperature and vibration)

22. In regards to Claims 21 and 22, they are rejected under the same grounds as claim 6.

### ***Response to Arguments***

#### ***Re: Claim Rejections - 35 USC § 101***

23. Examiner has found Applicants' arguments (see p.6 of amendment filed 12/12/05) regarding the 101 rejections of dependent claims 7-9, 11, 12-19 and 21 to be persuasive. These rejections have been withdrawn.

24. Examiner has reviewed the independent claims 1, 21, and 22, and found that they meet the 35 U.S.C. 101 requirements of a "concrete, useful tangible result" as set out in *State Street Bank & Trust Co. v. Signature Financial Group Inc.*, 149

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F.3d at 1374-75, 47 USPQ2d at 1602 (Fed.Cir. 1998); and *In re Warmerdam*, 33 F.3d 1354, 31 USPQ2d 1754 (Fed. Cir. 1994).

*Re: Claim Rejections - 35 USC § 112, 2<sup>nd</sup> para.*

25. Applicants have amended independent claims 1, 21, and 22 to include definitions of the variables. Examiner has therefore withdrawn the relevant rejections.
26. In regards to the other 35 USC § 112, 2<sup>nd</sup> para. rejections, Examiner has found Applicants' arguments (see p.7 of amendment filed 12/12/05) regarding the 112 rejections of dependent claims 7-9, 11, 12-19 and 22 to be persuasive. These rejections have been withdrawn.

*Re: Claim Rejections - 35 USC § 103.*

27. In light of Applicants' amendment to the claims, which defined the parameters, Examiner has modified the previously applied 35 USC § 103 rejections.

***Conclusion***

28. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is

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filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

***Correspondence Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ayal I. Sharon whose telephone number is (571) 272-3714. The examiner can normally be reached on Monday through Thursday, and the first Friday of a biweek, 8:30 am – 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez can be reached at (571) 272-3753.

Any response to this office action should be faxed to (703) 872-9306, or mailed to:

USPTO  
P.O. Box 1450  
Alexandria, VA 22313-1450


or hand carried to:

USPTO  
Customer Service Window  
Randolph Building  
401 Dulany Street  
Alexandria, VA 22314

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Tech Center 2100 Receptionist, whose telephone number is (571) 272-2100.

Ayal I. Sharon  
Art Unit 2123  
March 14, 2006

  
Paul L. Rodriguez 3/15/06  
Primary Examiner  
Art Unit 21252123